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REMARKS/ARGUMENTS

Applicant would like to thank the Examiner for the thorough review of the present application. As discussed in detail below, the present claims in the present application include recitations that patentably distinguish the claimed invention over the cited references, taken individually or in combination. Based upon the following remarks, Applicant respectfully requests reconsideration of the present application and allowance of the pending claims.

The Present Invention

The invention provides for an imaging device and associated methods for simultaneously capturing image data and image display update. The invention implements first and second buffers (i.e., dual or double buffers) that are capable of capturing an image in one buffer while a second buffer displays the image on an associated imaging device display. This provides for overall efficiency in the use of the device, in that the imaging device and method provide the capability to capture and display every frame that the imager processes. Such a device benefits from real-time aiming, capture and display of image data.

The invention requires, per Claim 1, that the two image capture buffers be included within a single memory module and that this memory module be accessible to the Central Processing Unit (CPU). The first image capture buffer is required, per Claim 1, to temporarily store first-in time captured image data prior to displaying the first-in-time image data and the second image capture buffer is required, Claim 1, to temporarily store second-in-time captured image data prior to displaying second-in-time image data.

35 U.S.C. § 103 (a) Rejection

Roth '528 Patent in view of the Shand '159 Patent and the '122 Anderson

Claims 1-6, stand rejected under 35 U.S.C. § 103 (a) as being unpatentable over United States Patent No. 5,818,528, issued to Roth (the Roth '528 patent) and United States Patent No.

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5,692,159 issued to Shand (the Shand '159 patent) in view of United States Patent No. 6,567,122, issued to Anderson et al. (the Anderson '122 patent). Specifically, the Examiner asserts that the Roth '528 patent, the Shand '159 and the Anderson '122, in combination teach the following elements of Claim 1:

1. An imaging device for simultaneous image capture and image display updating (*Roth '528 at Fig. 1, Col. 7, lines 24-27; Col. 16, lines 48-66; Fig. 22, Col. 25 lines 2-12*) the device comprising:

an imager (*Roth '528 at Column 3, lines 45-67*) for capturing image data upon aiming the imager at an image (*Roth '528 at Column 7, lines 22-38*);

a central processing unit (CPU) that is in communication with the imager and issues commands to capture image data (*Roth '528 at Column 4, lines 40-55*);

a direct memory access module in communication with the imager and the CPU that executes the commands to capture image data (*Shand '159 at Column 4, lines 1-5; 43-55*); and

a memory module in communication with the CPU and the DMA module, the memory module including a first image capture buffer, accessible to the CPU, that temporarily stores first-in-time captured image data prior to displaying first-in-time image data and a second image capture buffer, accessible to the CPU, that temporarily stores second-in-time captured image data prior to displaying second-in-time image data. (*Shand '159 at Col. 2, lines 5-25; Fig. 1, element 300; Col. 3, lines 19-22 (image buffer), 30-32 (frame buffer for storing pixels of a displayed image); 35-40, line 55 – Col. 4 line 5; Col. 5, lines 5-64, double buffers; Col. 4 lines 63- Col. 5, line 12*) (*Anderson '122 at Figure 4, storing raw and compressed image data, input buffers, variables used by the CPU, Column 7, lines 35-60*).

The applicant respectfully disagrees with the Examiner's rejection of the Claims under 35 U.S.C. § 103 (a) for the following reasons.

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The Shand '159 Patent Does Not Provide a Motivation to Combine the Teachings therein with the Teachings described in the Roth '528 Patent.

Aside from the convincing argument presented above, the Applicant does not believe that Shand '159 provides the requisite motivation, required by 35 U.S.C. 103 (a), to combine the teachings in the Shand '159 patent with the teachings in the Roth '528 patent to obviate the present invention.

The Shand '159 reference is motivated by the need to relieve the CPU of the burden of reformatting image data. The present invention does not concern itself with reformatting image data, but rather addresses the need to allow the CPU to draw streaming image data on the display more quickly.

The Examiner relies on the following portions of the Shand patent to provide motivation for combining. According to the Examiner, Column 1, lines 30-37 provides motivation in that it the Shand '159 patent "enables reading high precision images as fast as possible. According to this portion of the Shand '159 patent the motivation is, ". . . adapt externally produced image signals having a higher precision than eight bits to conventional frame buffers." The Examiner has *paraphrased* this section of the specification to mean "enable reading high precision images as fast as possible. Applicant believes that the problems addressed in the Shand '159 patent, and specifically those noted at Column 1, lines 30-37, are drawn to maintaining pixel precision for subsequent processing and are not concerned with efficiency in displaying captured images. Thus, Applicant is steadfast in failing to appreciate how this motivation can be equated with enabling reading of high precision images as fast as possible.

At Column 1, lines 38- 48, the Examiner states that motivation is provided, in that, the Shand '159 patent addresses enabling real-time software format processing of image data. The present invention does not address reformatting image data. The present invention is concerned and addresses a need to provide real-time image display.

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At Column 2, lines 20-25, the Examiner states that motivation is provided, in that, the Shand '159 patent addresses a *DMA controller* to transport the combinations of the first portions of the input digital signals as output digital signals to the memory of the computer system. As previously addressed at length in Applicant's December 15, 2003 response, use of a DMA controller does not add to the efficiency of capturing and displaying an image simultaneously. In the Shand' 159 patent they rely on the DMA controller to perform tasks typically executed at the processor.

Additionally, at Column 4, lines 3-5, the Examiner states that motivation to combine is found in the DMA controller that enables data signals to be transported from a source to a destination with minimal utilization of processor resources. The statement is in direct conflict with the goals of the present invention. The present invention *does* rely on the processor to provide efficiency in displaying images.

At Column 4, line 38 – 42, the Examiner states that motivation is provided, in that, the Shand '159 patent addresses double buffers that enable receiving pixel data from a converter. The present invention does not implement a converter because the present invention does not reformat data. The use of double buffers in the Shand '159 invention is to accelerate the storage of the data into memory. In the present invention the double buffers are already in memory.

At Column 3, lines 50-55 and at Column 6, lines 15-54, the Examiner states that motivation is provided, in that, the Shand '159 patent teaches an interface that is configurable so that cameras producing digital signals of various pixel widths can easily be adapted to the processor. Additionally, at Column 6, lines 15-23, the Shand patent specifically states the purpose of the configurable formatter, “images are presented as high bandwidth input digital signals, e.g., pixels, which can have various widths. The *pixels are reformatted*, in real time, to be compatible with conventional image processing systems...” Once again, the Shand '159 patent is concerned with reformatting pixels in real-time. The present invention does not concern itself with reformat data to accommodate various pixel widths The Applicant's invention does not reformat data. The Applicant's invention is directed toward efficiency in capturing and

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displaying images. The gist of the Shand '159 is entirely different than the purpose of the present invention.

Therefore, since the Applicant asserts that the Shand '158 patent provides no motivation for combining the teachings therein with the teachings in the Roth '528 patent, the Examiner has not met the burden of demonstrating the requisite motivation that 35 U.S.C. 103 (a) requires.

Claims 2-6 are dependent claims that depend from Claim 1. These claims add further limitations to Claim 1. Therefore, since the Applicant believes that Claim 1 is patentable, in view of the remarks above, the dependent Claims 2-6 must also be deemed patentable, as a matter of law.

The Anderson '122 Patent Does Not Teach a First Image Capture Buffer, Accessible to the CPU, that Temporarily Stores First-In-Time Captured Image Data prior to Displaying First-in-Time Image Data and a Second Image Capture Buffer, Accessible to the CPU, that Temporarily Stores Second-In-Time Captured Image Data Prior to Displaying Second-In-Time Image Data

The Anderson '122 patent provides a teaching of multiple input buffers and a frame buffer that are included in working memory. Additionally, the patent teaches that each input buffer and frame buffer is split into two separate buffers to improve the display speed of the digital camera. However, the Anderson '122 patent provides no teaching as how the multiple input buffers, or the fact that they are split into two separate buffers provide for an improvement in speed. Specifically, the Anderson '122 patent provides no teaching of the specific functional limitations of Claim 1. That is, a first image capture buffer *that temporarily stores first-in-time captured image data prior to displaying first-in-time image data* and a second image capture buffer *that temporarily stores second-in-time captured image data prior to displaying second-in-time image data*.

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Additionally, the Anderson '122 patent teaches that the working memory includes various stacks, data structures and variables that are used by the CPU while executing the software routines within the computer. The Examiner makes the assumption that means that the buffers in the memory are accessible to the CPU. The applicant fails to appreciate this assumption without being provided further teaching within the Anderson '122 patent. The Applicant has thoroughly analyzed the Anderson '122 patent and does not appreciate any further teaching. After the specification lists other components of the working memory that are used by the CPU (i.e., various stacks, data structures and variables to execute software routines), the specification states that the working memory also includes several input buffers and makes no reference to these buffers being used or accessible to the CPU. In this regard, an assumption can be made that the buffers are not included within the portions of the memory that are accessible to the CPU.

Therefore, since the Applicant asserts that the Anderson '122 patent provides no teaching of specific functional limitations of Claim 1, the claim should be found to be patentable under 35 U.S.C. § 103 (a).

Claims 2-6 are dependent claims that depend from Claim 1. These claims add further limitations to Claim 1. Therefore, since the Applicant believes that Claim 1 is patentable, in view of the remarks above, the dependent Claims 2-6 must also be deemed patentable, as a matter of law.

Claim 7 stands rejected under 35 U.S.C. § 103 (a) as being a unpatentable over United States Patent No. 5,818,528, issued to Roth (the Roth '528 patent) and United States Patent No. 5,692,159 issued to Shand (the Shand '159 patent) in view of United States Patent No. 6,567,122, issued to Anderson et al. (the Anderson '122 patent). However, the Examiner has

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provided the same rejection as was provided in the previous Office Action and cites only references to the Roth '528 patent.

A method for simultaneous image capture and image display in an imaging device, the method comprising the steps of:

capturing first-in-time image data to a first image capture buffer that is in communication with an imager;

capturing second-in-time image data to a second image capture buffer that is in communication with an imager; and

displaying the first-in-time image data on a display while the image device captures the second-in-time image data to the second image capture buffer.

The Examiner directs the Applicant to the following portions of the Roth '528 patent: video Ram and label image data, Column 13, lines 40-67; static RAM, Column 14, lines 16-47; gain values, Column 4, lines 12-14, 37-55; the second memory includes a bin...to each possible intensity level; Column 16, lines 28-35; Figures 11, Column 17, lines 35-37; Column 19, lines 46-Column 20, line 6, three distinct fields or exposures; data buffers, Column 20, lines 12-24.

The applicant respectfully disagrees with the Examiner's rejection of the Claim 7 for the following reasons.

The Roth '528 Patent Fails to Disclose Capturing First-In-Time Image Data to a First Image Capture Buffer and Capturing Second-In-Time Image Data to a Second Image Capture Buffer.

The Applicant fails to appreciate any teaching in Roth of double buffers that capture "first-in-time" and "second-in-time" image data. Column 4, lines 40-55 describe a method for generating a histogram to evaluate the intensity of an image. The method includes first and

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second memories. The first memory defines test bits and the second memory includes a bin corresponding to each possible intensity level of the pixels. The second memory stores the histogram. Applicant respectfully asserts that these memories are not image capture buffers, which capture "first-in-time" and "second-in-time" images. By definition, a buffer will characteristically change over time, in terms of the data that it stores. In the Roth '528 patent the first memory stores bits and the teaching implies that memory containing the bits will never change. If the memory does not change, it cannot be stated that the memory stores "first-in-time" data, such as in an image capture buffer.

Additionally, Column 4, lines 37 - 55 of the Roth '528 patent describes how a histogram is generated. Column 20, line 21 to Column 21, line 56 of the Roth '528 patent elaborates on how the histogram is generated. Column 4, lines 48 - 50 of the Roth '528 patent describes how a first memory containing test bits is used to select which bin in the histogram will be incremented. Column 20, lines 32 - 48 of the Roth '528 patent describes how a HIT TABLE containing HIT BITS is used to select which bins in a histogram will be incremented. The applicant infers that that the HIT TABLE is the same as the first memory and the HIT BITS are the same as the test bits. As discussed above the test bits, i.e., HIT BITS are permanently stored in the HIT TABLE of the first memory. Applicant fails to appreciate how the HIT TABLE and the HIT BITS equate to image capture buffers that capture "first-in-time" image data.

Moreover, at Column 20, lines 32-33 the Roth '528 patent states that the HIT TABLE is stored in EPROM. EPROMs are typically written once. Once written, it is not possible to change the data in them without going through a lengthy erase cycle. The fact that the HIT TABLE, or first memory is stored in EPROM and Roth does not describe a mechanism for erasing the EPROM, is a strong indication that Roth did not intend for this memory to change, much less store "first-in-time" image data.

If the Examiner believes that other portions of the Roth '528 patent specifically teach the required steps of Claim 7, the Applicant respectfully asks that the Examiner specifically state which portions of the Roth '528 teaching specifically teach each and every step of the method

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claimed in Claim 7. Additionally, if the Examiner believes that Shand '159 patent or the Anderson '199 patent teach steps of Claim 7, the Applicant respectfully asks the Examiner to specifically state which portions of those patents apply.

Therefore, Applicant asserts that Claim 7 directed towards an a method for simultaneous image capture and image display in an imaging device is distinguishable from the teachings of Roth '528 patent and, in particular does not teach capturing first-in-time image data to a first image capture buffer and capturing second-in-time image data to a second image capture buffer.

Claims 8 - 14 are dependent claims that depend from Claim 7. These claims add further limitations to Claim 7. Therefore, since the Applicant believes that Claim 7 is patentable, in view of the remarks above, the dependent Claims 8-14 must also be deemed patentable, as a matter of law.

Claims 15- 27, stand rejected under 35 U.S.C. § 103 (a) as being unpatentable over the Roth '528 patent in view of the Shand '159 patent. The Examiner states that independent Claim 15 is representative of Claim 9, which depends from independent Claim 7.

The Applicant fails to appreciate the rejection presented by the Examiner because independent Claim 15 is not equivalent to the combination of Claims 7 and 9. Claim 15 has specific limitations that differ in breadth and scope to those presented by Claim 9. Specifically Claim 9 does not include the step of signaling EOF upon completion of capturing the first-in-time image data to the first image capture buffer nor is there a step requiring issuance of a third command to capture third-in-time image data to the first image buffer prior to executing the second capture command.

Therefore, Applicant asserts that Claim 15 directed towards a method for simultaneous image capture and image display in an imaging device is distinguishable from the cited

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references in particular does not teach signaling EOF upon completion of capturing the first-in-time image data to the first image capture buffer nor is there a step requiring issuance of a third command to capture third-in-time image data to the first image buffer prior to executing the second capture command. Hence, the Applicant asserts that Claim 15 can not be obviated by the combination of Roth '528 in view of Shand '159, because Roth '528 does not teach the previously mentioned specific steps of the method claim.

Claims 16-27 are dependent claims that depend from Claim 15. These claims add further limitations to Claim 15. Therefore, since the Applicant believes that Claim 15 is patentable, in view of the remarks above, the dependent Claims 16-27 must also be deemed patentable, as a matter of law.

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Conclusion

In view of the remarks submitted above, it is respectfully submitted that the present claims are in condition for immediate allowance. It is therefore respectfully requested that a Notice of Allowance be issued. The Examiner is encouraged to contact Applicant's undersigned attorney to resolve any remaining issues in order to expedite examination of the present invention.

It is not believed that extensions of time or fees for net addition of claims are required, beyond those that may otherwise be provided for in documents accompanying this paper. However, in the event that additional extensions of time are necessary to allow consideration of this paper, such extensions are hereby petitioned under 37 CFR § 1.136(a), and any fee required therefore (including fees for net addition of claims) is hereby authorized to be charged to Deposit Account No. 16-0605.

Respectfully submitted,

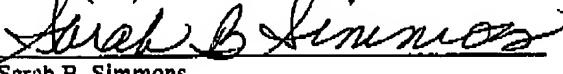


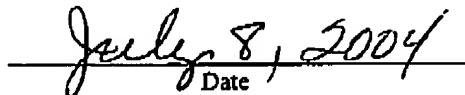
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